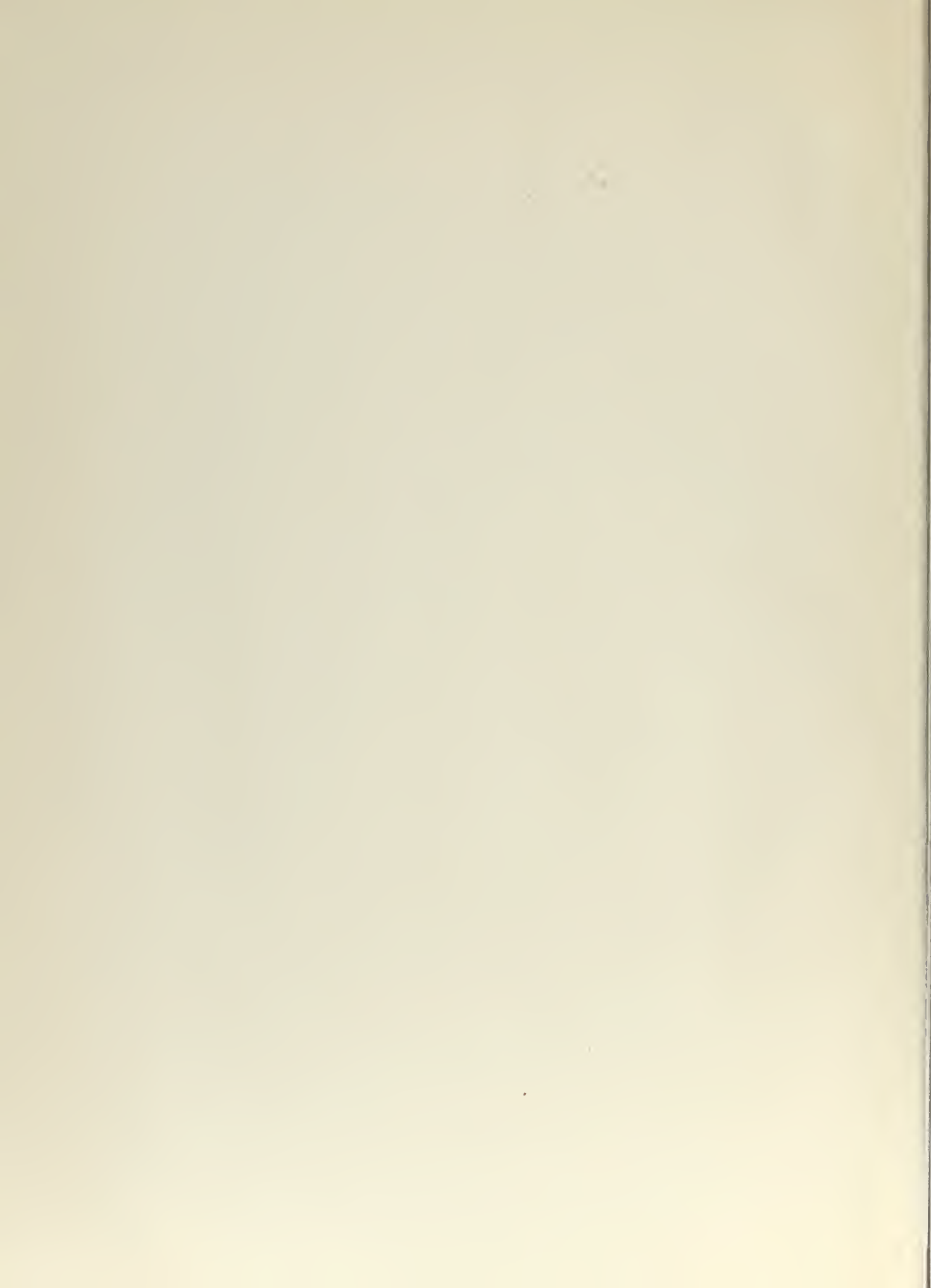


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INVESTIGATION INTO THE CONCEPTS OF
FLIGHT CREW UTILIZATION

DAVID L. HUGHES
and
JACK D. SIRRINE



INVESTIGATION INTO THE CONCEPTS
OF FLIGHT CREW UTILIZATION

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Submitted in partial fulfillment of
the requirements for the degree of

MASTER OF SCIENCE
IN
MANAGEMENT

United States Naval Postgraduate School
Monterey, California

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OF FLIGHT CREW UTILIZATION

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This work is accepted as fulfilling
the research paper requirements for the degree of

MASTER OF SCIENCE

IN

MANAGEMENT

from the

United States Naval Postgraduate School

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ABSTRACT

The contribution of a patrol squadron to the total ASW readiness is dependent in part upon the effectiveness with which allocated or assigned personnel are utilized. In the hope of increasing that effectiveness, organizationally induced problems encountered in the allocation and utilization of flight crew personnel were investigated. A possible solution is offered which involves minor organizational changes, establishment of a flight crew rate, and a functional application of manning level constraints.

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CHAPTER I

INTRODUCTION

Patrol Squadrons with a primary mission to conduct all-weather anti-submarine operations, assigned to Patrol Air Wings of the Atlantic and Pacific Fleets, contribute a large portion of the overall anti-submarine warfare effort of the Navy. These squadrons consist of approximately 50 officers, 270 enlisted personnel, 12 patrol aircraft, and various organizational support equipment.

In addition to the mission requirement, a patrol squadron is required to perform the necessary administrative and support functions. The squadron also performs the majority of the organizational maintenance on its equipment and aircraft, short of overhaul. The contribution of the individual patrol squadron to the overall ASW ability of the Navy depends directly on the effectiveness with which the squadron utilizes its resources to maintain its individual mission ability, or mission readiness.

The individual resource categories available to a squadron are many in number but basically all are included in the three categories of men, money, and materials. The fundamental problem in maintaining a high mission ability, or mission readiness, is the decision concerning the allocation, within the established organization, of the available resources to obtain their maximum utilization.

The organization of any individual patrol squadron must be designed and established to promote effective allocation and utilization of all the assigned resources by the proper separation and identification

of the major decision areas contributing to the squadron mission. Organizational structures which do not recognize and separate these decision areas only increase unnecessarily, by organizationally induced problems, the number of factors requiring consideration in allocation decisions.

The purpose of this paper is to examine the organizationally induced problems encountered in the allocation and utilization of only one of the squadron resources, flight crew personnel, and offer a possible solution to the problems.

CHAPTER II

GENERAL INFORMATION

The Naval Warfare publication, "Missions and Characteristics of U. S. Naval Ships and Aircraft," defines the mission of the patrol squadron as follows:¹

To conduct all weather antisubmarine operations.

The following tasks are included within the scope of the above defined mission:²

- a. To detect, track and destroy enemy submarines, singly or in conjunction with other air, surface or subsurface force.
- b. To conduct antisubmarine escort of convoys and fleet units.
- c. To patrol sea and coastal areas to protect against enemy submarine penetrations and submarine launched attack.
- d. Within the capabilities of ASW configured aircraft and ASW trained crews, conduct the following:
 - 1) Aerial mining.
 - 2) Reconnaissance.
 - 3) Assistance in air/sea rescue operations.
 - 4) Destruction of enemy shipping.

The normal operational chain of command of a patrol squadron assigned to the Pacific Fleet is shown in figure 1. A similar chain

¹NWIP 11-20, Missions and Characteristics of U. S. Naval Ships and Aircraft (U), Department of the Navy, Office of the Chief of Naval Operations, 6 November 1961, p. 13-38.

²Ibid.

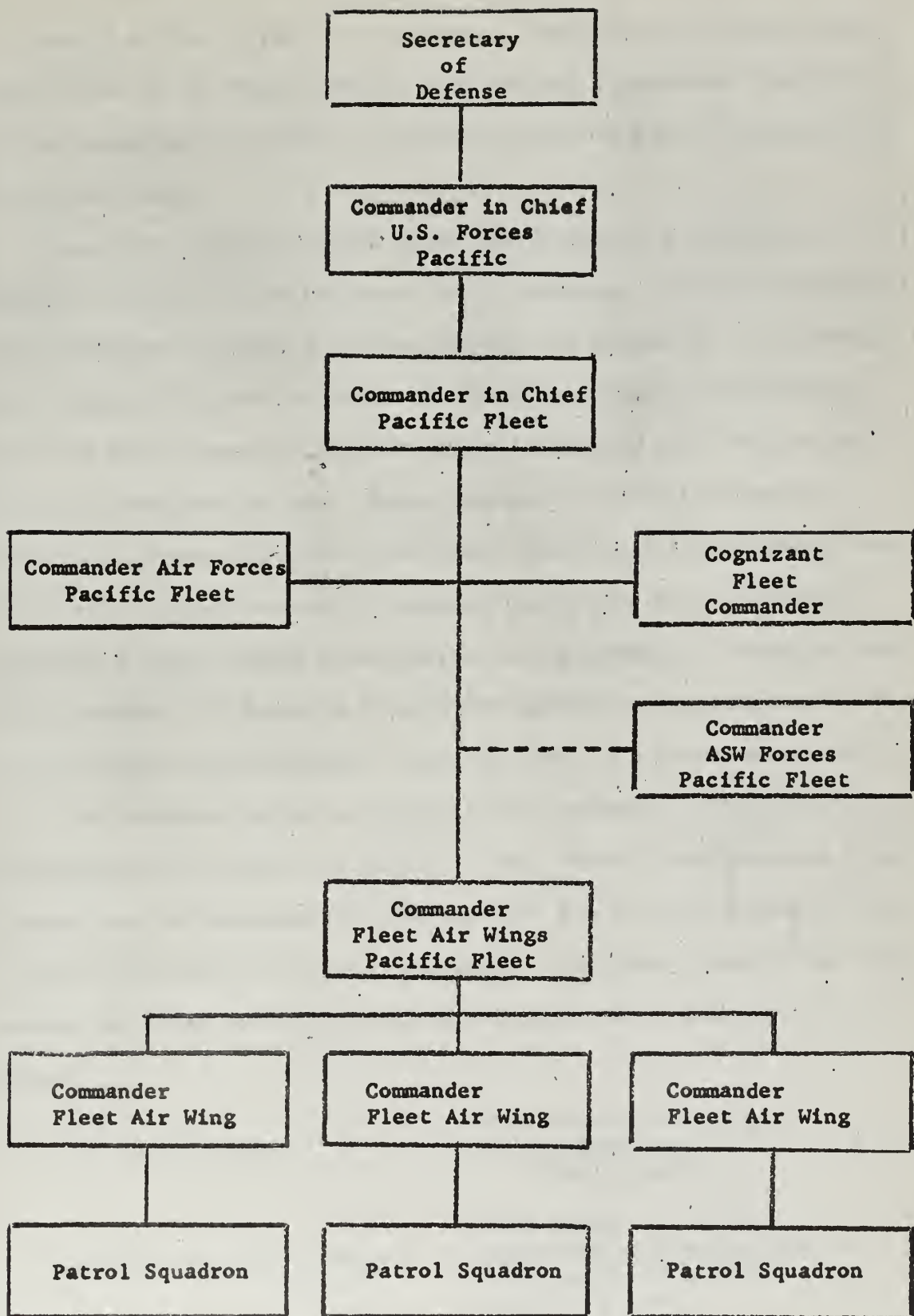


FIGURE 1
OPERATIONAL CHAIN OF COMMAND

of command exists in the Atlantic Fleet. Squadrons are grouped into Wings under an Air Wing Commander, who assigns operational commitments to the squadrons and serves to coordinate the efforts of the squadrons within the Wing.

The total military output of the ASW forces is a function of the combined outputs of the individual units assigned. The contribution of the individual squadron's mission ability, or readiness, to the total ASW readiness is shown in figure 2. This contribution is dependent upon the effectiveness with which these individual units utilize the resources assigned to them. These resources include, but are not limited to, operating funds, personnel, primary mission equipment, and facilities. Effectiveness of resource utilization must be judged in terms of a single agreed criterion, or value judgment. Presently, the effectiveness of a squadron is measured indirectly by assigning a calculated value to its military output in terms of a "Readiness Index."

The Readiness Index is a quantitative judgment of the ability of the squadron to perform its mission. This Index is expressed as a percentage and is determined by adding points for (a) Crew Training, (b) Aircraft Availability, and (c) Personnel. The final formulae for determining the point values for each of the above three areas are as follows:

Crew Training Points	=	$\frac{\text{Total accumulated points for squadron crews}}{\text{Crews allowed}}$	X	.65
Aircraft Availability Points	=	$\frac{\text{Total number of aircraft operationally ready at 0800}}{\text{Total number of aircraft actually on board}}$	X	.20

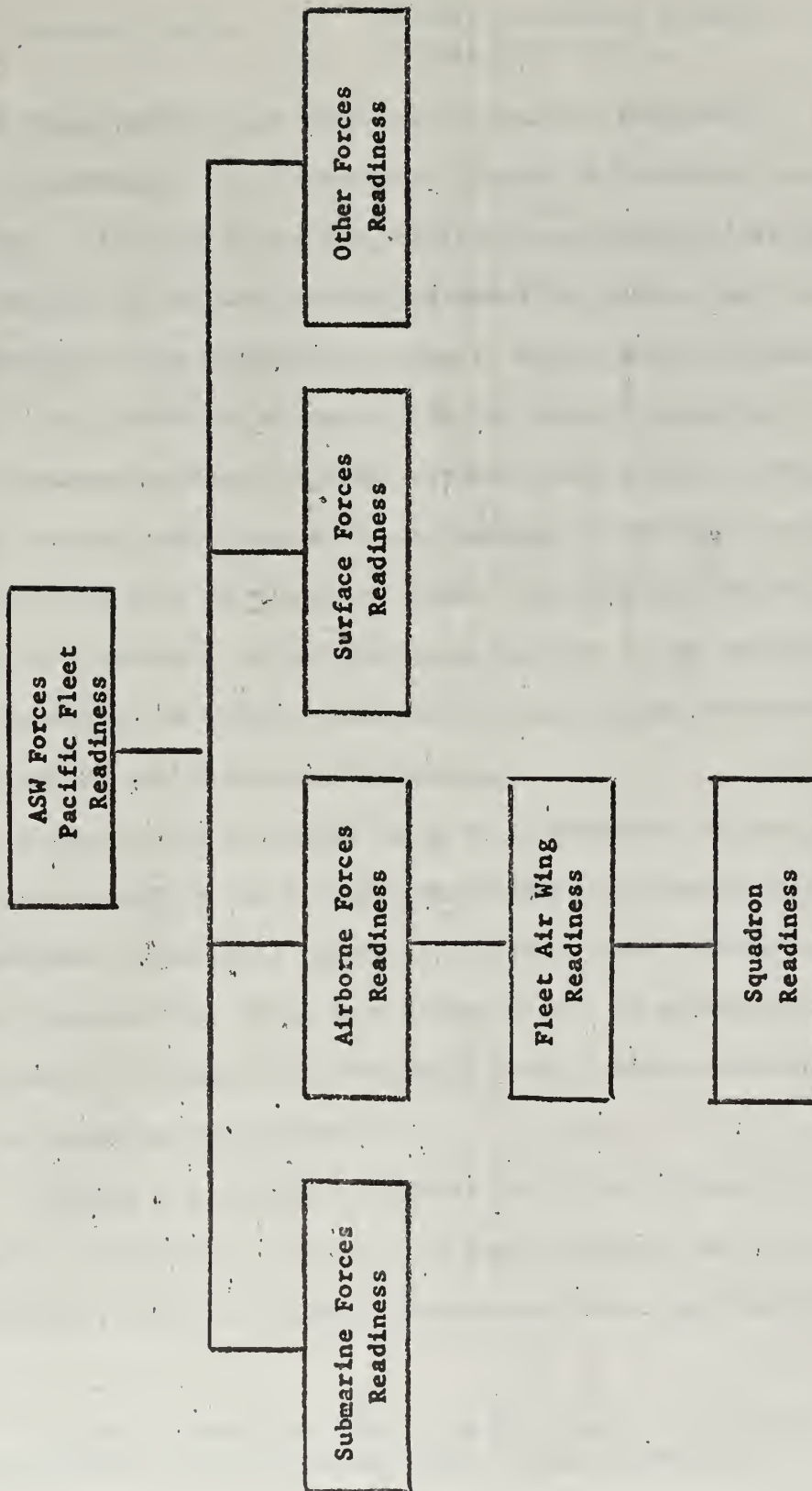


FIGURE 2
SQUADRON CONTRIBUTION TO ASW FORCES READINESS

$$\text{Personnel Points} = \frac{\text{Percent of allowed aviation ratings on board}}{\text{ratings on board}} \times .15$$

These three formulae are basic to all patrol squadrons.³

Personnel points achieved are directly dependent on the percent of aviation ratings on board and are in no way controlled by the squadron. The percent of aviation ratings on board is, within small variations, determined by the Fleet Manning Level, established by higher authority, and can be considered a constant factor for all squadrons.

Assuming adequate material support, both aircraft availability and crew training points are a direct function of the time, or manhours allocated to each of these two areas. The squadron has direct control over the allocation of the available manhours of the assigned personnel and therefore can directly affect the point values achieved for aircraft availability and flight crew training.

Accepting the readiness index as an adequate indirect measurement of mission ability and a direct measurement of squadron effectiveness immediately establishes two major decision areas. These areas are aircraft availability, which is a direct result of aircraft maintenance performed, and flight crew training, both of which directly contribute to the squadron effectiveness.

Although the available manhours are directly controlled by the squadron, efficient utilization of these manhours can be adversely affected by the very squadron organization which has been established

³Commander Fleet Air Wings, Pacific Fleet Instruction 03500.3, Readiness Reporting by Pacific Fleet Patrol Squadrons (U), 31 December 1964.

to accomplish the assigned mission.

Recognition of the need to effectively utilize the limited manhour resource has been clearly demonstrated by the implementation of the Standard Navy Maintenance and Material Management System (3M System) which provides for a uniform means of planned maintenance throughout the operating forces of the Navy, including patrol squadrons. In comparison, proportionate effort must be expended to improve the basic squadron organization to provide for more effective utilization of all personnel, but primarily flight crew personnel.

CHAPTER III

PRESENT SQUADRON ORGANIZATION AND PERSONNEL ALLOWANCE

A standard organization has long been recognized as a valuable management tool for more effective use of personnel. The Navy has made extensive use of a standard organization among units with identical mission assignments. The basic patrol squadron organization is shown in figure 3, and is applicable to the squadrons considered by this paper.

The typical patrol squadron is composed of three basic departments, the Administrative, Operations, and Maintenance Departments. Each of these departments is administered by a department head who is subordinate to an Executive Officer and a Commanding Officer. These department heads are responsible for the operation and overall performance of their department and the basic duties enumerated by U. S. Navy Regulations.¹

The Administrative Department is normally organized as shown in figure 4 under the supervision of the Administrative Officer.² This department is responsible for the administration of the squadron correspondence, officer and enlisted personnel matters, legal matters, and any other matters of an administrative nature. The Administrative Officer is assisted in the performance of his duties by junior officers assigned to the positions indicated in figure 4. Assignment of enlisted

¹U. S. Navy Regulations, Department of the Navy, Office of the Secretary of the Navy, 9 August 1948, Chapter 9, p. 111.

²NWIP 41-1, ASW Patrol Aircraft (U), Department of the Navy, Office of the Chief of Naval Operations, 20 June 1961, p. 2-7.

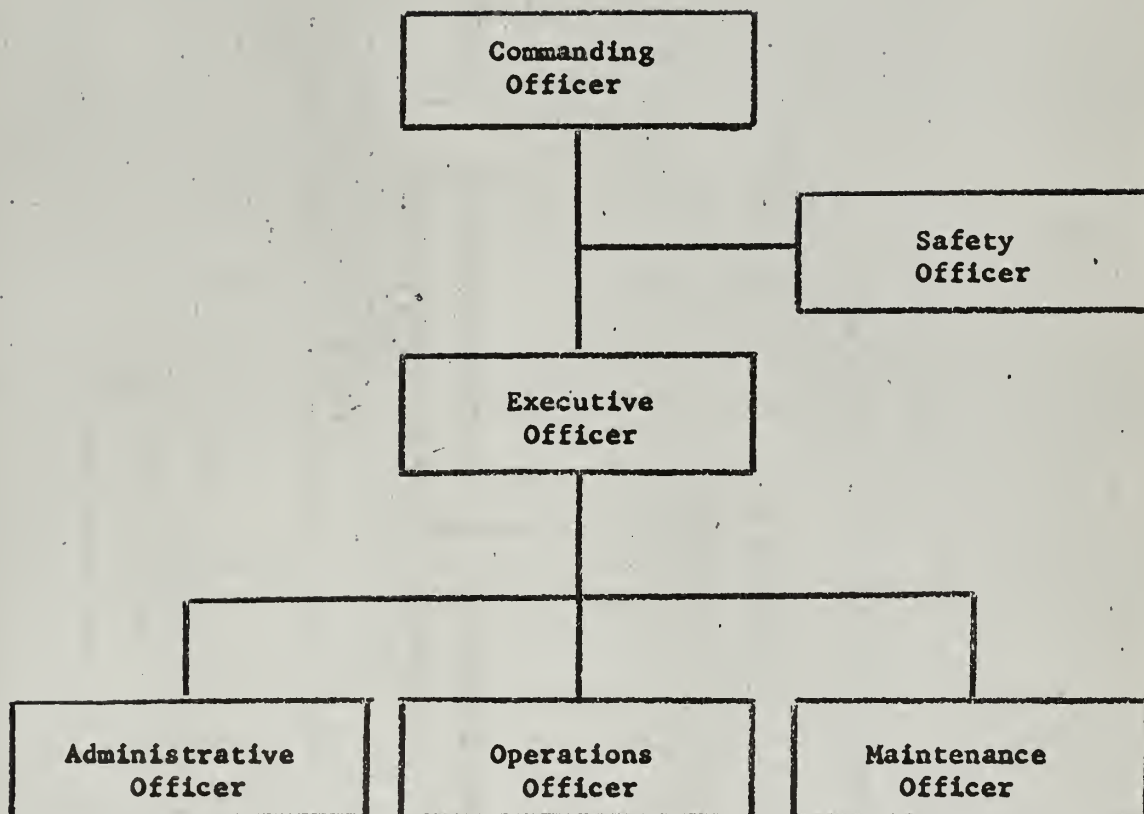


FIGURE 3

SQUADRON ADMINISTRATIVE ORGANIZATION

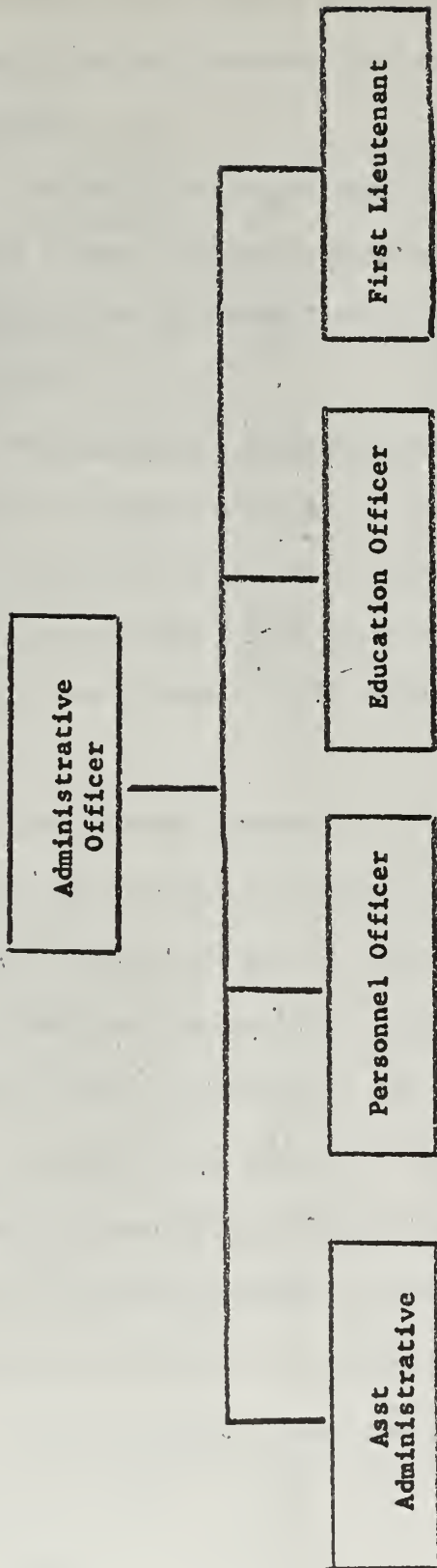


FIGURE 4

ADMINISTRATIVE DEPARTMENT ORGANIZATION

personnel to the various functions within the department completes the organization and provides the administrative services required by the squadron.

The Operations Department is normally organized as shown in figure 5 under the supervision of the Operations Officer.³ He is responsible for the operational readiness of the squadron personnel and aircraft.

The personnel responsibilities include, but are not limited to, flight and ground training for pilots and flight crews, training of other personnel in all areas pertaining to the proper operation of aircraft, maintenance of an up-to-date tactical organization bill assigning flight crew personnel, and control of flight crew operational activities.

The aircraft readiness responsibilities of the Operations Officer include the control of squadron flight operations, coordination with the Maintenance Officer to insure the available aircraft are operationally ready for the assigned mission, and any other matters of an operational nature pertaining to the squadron aircraft.

The Operations Officer is assisted in the performance of his duties by the officers assigned to the various positions shown in figure 5. Enlisted personnel are also assigned to the various branches within the department to complete the organization.

The Maintenance Department is normally organized as shown in

³Ibid.

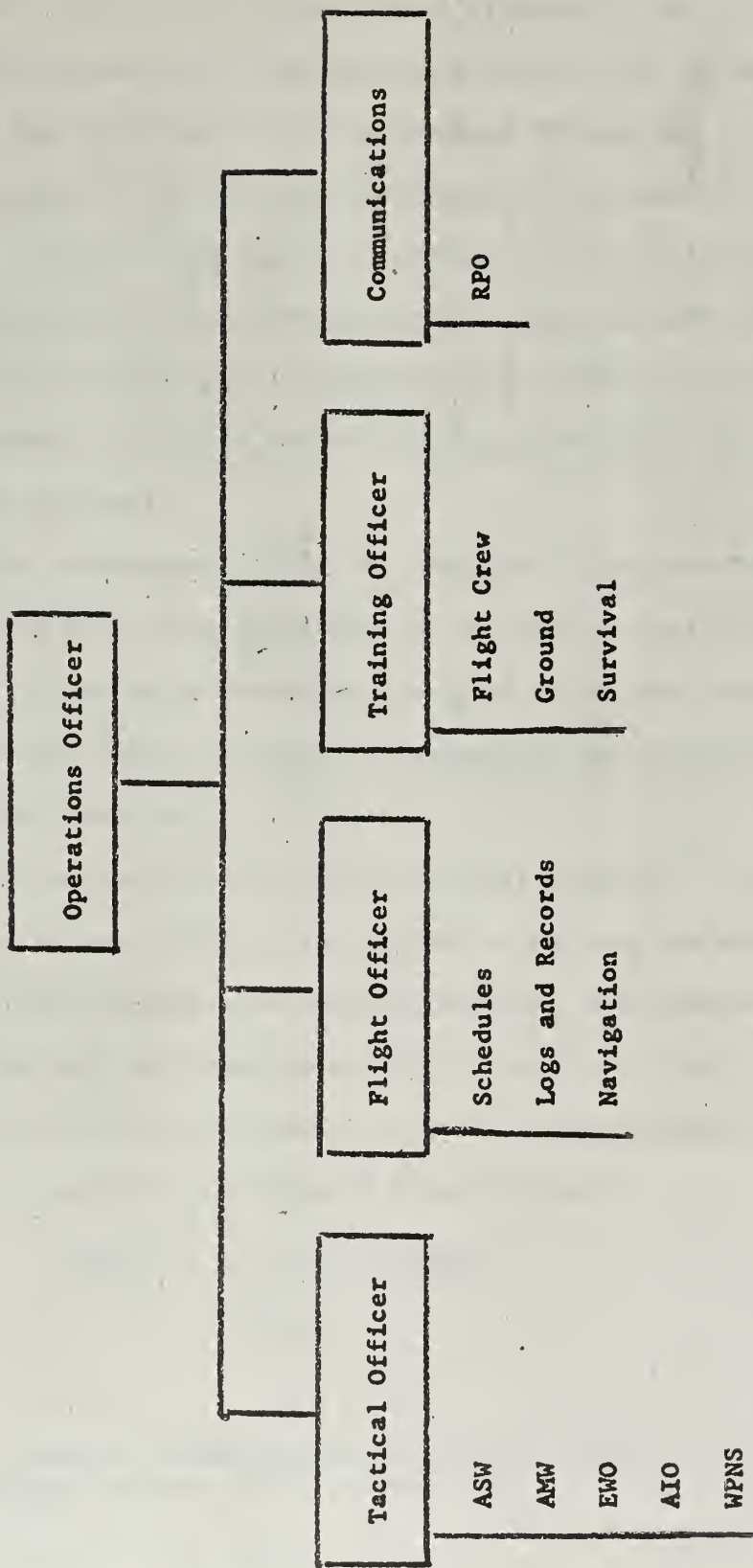


FIGURE 5
OPERATIONS DEPARTMENT ORGANIZATION

figure 6, which is the organization directed by the current Bureau of Weapons Instruction.⁴ The Maintenance Department is under the supervision and direction of the Maintenance Officer who is responsible for the support of the squadron operations by the upkeep of assigned aircraft and associated support equipment to the level required. The primary functions of the Maintenance Department include, but are not limited to, maintenance, inspection and servicing of assigned aircraft, maintenance of records and technical publications, and training of assigned personnel.

The Maintenance Officer is assisted in the performance of his duties by the officers assigned to the various positions shown in figure 6. Enlisted personnel are assigned within the department to the various divisions and branches as required to accomplish the maintenance functions required.

The basic tactical unit of a patrol squadron is an aircraft and the operational flight crew required to perform the mission assigned. The flight crews are composed of personnel made available by the various divisions and branches within the squadron. The composition of a flight crew can vary dependent on the mission assigned, but a typical flight crew for an ASW mission is as follows:⁵

Officer: Aircraft Commander

Co-Pilot

⁴ Bureau of Naval Weapons Instruction 4700.2A, The Naval Aircraft Maintenance Program (U), 2 October 1964.

⁵ NWIP 41-1, op. cit., p. 4-3.

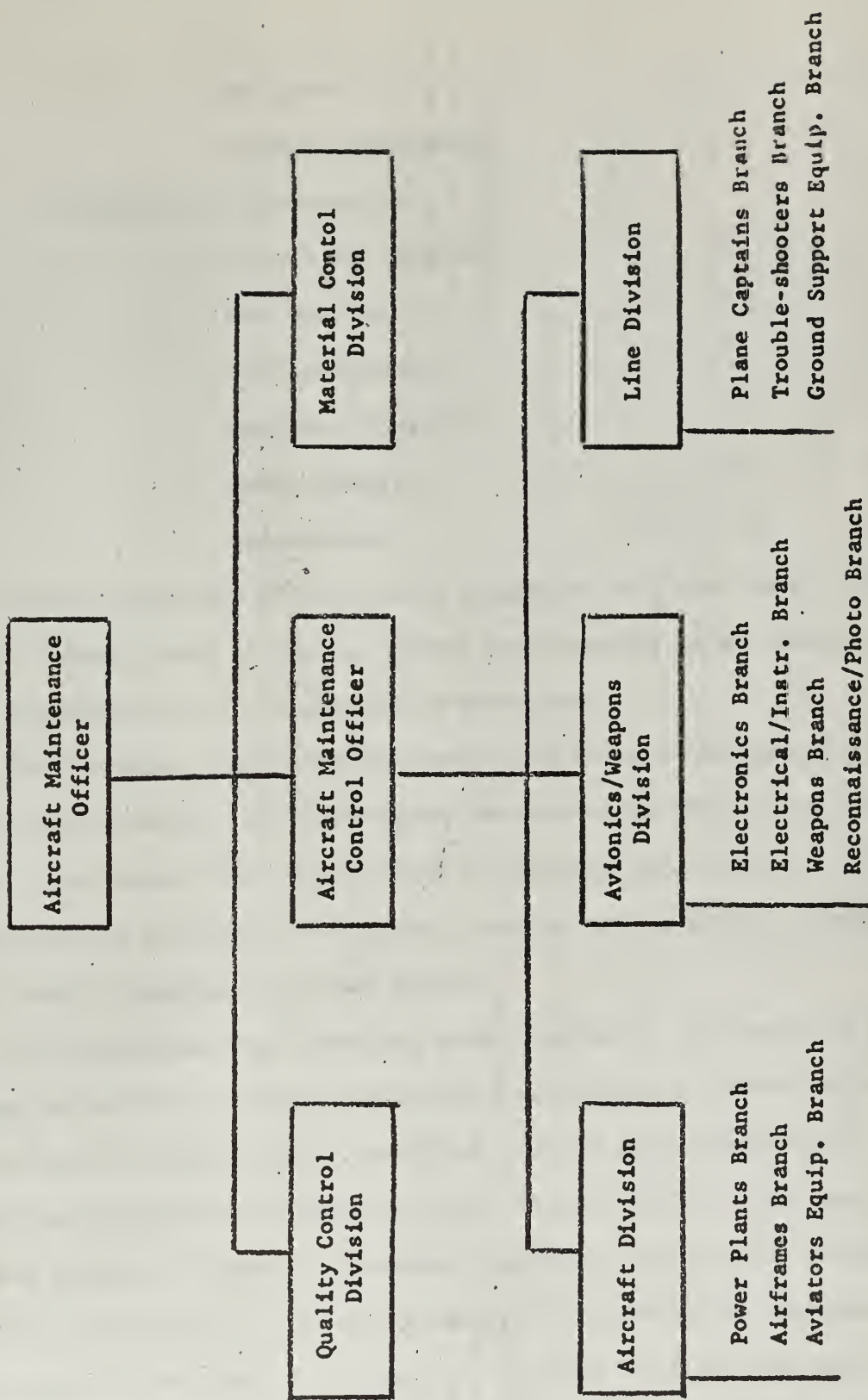


FIGURE 6

AIRCRAFT MAINTENANCE DEPARTMENT ORGANIZATION

Navigator

Tactical Coordinator

Enlisted: Plane Captain

Julie/Radar Operator

ECM Operator

Jezebel Operator

MAD/ASR-3 Operator

Radio Operator

Ordnanceman

A patrol squadron flight crew is organized as a functional unit and is trained, both flight and ground, and operates as a cohesive, well coordinated unit for maximum effectiveness.

The personnel complement of a patrol squadron is determined from three basic factors: the Maintenance and Operating (MO) factor, Crew factor, and Administrative and Support Personnel requirements. This predetermined complement is adequate to allow the squadron to operate at a level of maximum sustained effort.

The Maintenance and Operating Factor indicates the number of enlisted personnel, by rating, required to maintain and operate one specific type of aircraft for a specified level of maintenance for a specified flight hour utilization rate. This MO factor, when multiplied by the squadron's aircraft allowance, determines one portion of the personnel complement, by rate and number. This MO factor, although applicable to one type of aircraft, is adjusted to allow for the variation in enlisted rating requirements depending on the squadron mission assignment.

The second portion of the squadron complement is determined from the Crew factor. This factor, when multiplied times the aircraft allowance, determines the number of flight crews required.

The last portion of the squadron's complement is the number of Administrative Support personnel required. This is determined as a function of the number of personnel, exclusive of Administrative Support personnel, assigned from the above two factors.

The numerical total of the personnel required by these three factors constitutes the complement of the squadron. In peacetime, squadrons operate under an allowance which can be expressed as a percentage of the complement and provides for normal peacetime operations and limited sustained operating ability depending on the type of squadron. This allowance figure can be reduced by a manning level figure expressed as a percentage of personnel on board to the allowance. This manning level is the ultimate determination of the number of personnel assigned to a squadron, and is directly dependent on the availability of personnel within the Navy.

A more detailed explanation and breakdown of the MO factor, Crew factor, and Administrative and Support personnel, and sample calculations can be found in the current OPNAV Instruction⁶ covering personnel planning factors.

⁶OPNAV Instruction 05311.3C, Personnel Planning Factors for Aviation Activities (U), 1965.

CHAPTER IV

PROBLEM AREA DISCUSSION

Two major decision areas, aircraft availability and crew training, have been identified and determined to be affected directly by the manhours expended within each area and the effectiveness with which these manhours are utilized. Decisions within these areas must be such that the maximum measure of effectiveness, Readiness Index, is achieved. To accomplish this, the organization structure must recognize and separate these decision areas.

At first glance, these decision areas seem to be separate and distinct. However, within the framework of the present squadron organization the contrary is true. The organization provides for separating the functions of the two decision areas but not the personnel by which both, aircraft availability and crew training, are accomplished.

Aircraft availability, for purposes of the Readiness Index points, has been defined previously as the percentage of aircraft operationally ready in all respects. The responsibility for the material readiness of the aircraft is delegated to the Aircraft Maintenance Officer, as noted in chapter III. The Standard Navy Maintenance and Material Management System (3M System) Manual states in part:

The end objective of the Management system then is to insure the highest state of aircraft readiness and reliability at the lowest cost in men, money, and material. All other considerations are secondary to this objective. At the same time the Management System will insure that maintenance personnel, equipment, and facilities, are, in fact, utilized to

the fullest extent in the actual performance of maintenance and are not squandered in non-maintenance functions....¹

A necessary corollary to the attainment of the highest state of aircraft readiness is a comprehensive training program for the maintenance personnel. This function of aircraft availability is also the responsibility of the Aircraft Maintenance Officer.

Readiness Index points for crew training are awarded under the conditions set forth in the current Fleet Air Wings Instruction.² In general, they may be awarded to a crew only when each enlisted member of that crew is a qualified and coded (NEC) aircrewman having completed an individual flight crew training syllabus, that the crew has performed as a team on a minimum number of training exercises, missions, or simulator training periods, and that the crew has qualified in an airborne exercise required by current instructions. It is evident that crew training encompasses the requirements for both flight and ground training of the flight crew personnel, and the conduct of flight operations. The responsibility for these functions, as noted in chapter III, has been delegated to the Operations Officer.

As indicated above, the squadron organization recognizes the two Readiness Index decision areas, aircraft availability and crew training, and separates their functions. The accomplishment of these two functions

¹Department of the Navy, Office of the Chief of Naval Operations, Naval Aviation Maintenance and Material Management Manual, 9 December 1964, p. I-3.

²Commander Fleet Air Wings, U. S. Pacific Fleet Instruction, Readiness Reporting by Pacific Fleet Patrol Squadrons; instructions concerning (U), 31 December 1964.

however is complicated by the fact that flight crew personnel are utilized jointly by both the Maintenance and Operations Departments.

As noted previously, enlisted flight crew personnel are made available to the Operations Officer from the various divisions and branches within the squadron. These personnel are then formed into crews, which are scheduled and operationally trained under the cognizance of the Operations Officer. The ratings of the personnel included in the squadron's complement as aircrewmembers are set forth in the current OPNAV Instruction concerning personnel planning factors.³ The ratings presently listed are primarily maintenance ratings. These personnel are assigned, therefore, to the Aircraft Maintenance Department. Consequently, personnel serving as flight crew members are utilized both in attainment of factors of crew training and aircraft availability.

The present organization introduces conflict between the decision areas by forcing the utilization of the same personnel to achieve different functional goals, the responsibility for which rests with different officers. This fundamental organizational conflict is further intensified by the stated objectives of the two individual decision areas, which requires any consideration other than stated objectives to be secondary in nature. Under these conditions the Maintenance Officer and the Operations Officer will strive to maximize the output of the functions in their individual decision areas of responsibility. The adverse effects resulting from this enforced suboptimization becomes particularly conspicuous when operating under a personnel constraint

³ OPNAV Instruction 05311.3C, loc. cit.

imposed by a reduced manning level. Under such constraints, the squadron's overall personnel level is reduced, yet the flight crew personnel requirements remain constant, necessitating 100% manning. Since flight crews are formed from Maintenance Department personnel, the result of this requirement has the effect of reducing ground maintenance personnel by a factor larger than the original manning level figure, and the same maintenance requirements must be fulfilled with fewer personnel. The overall result is that flight crews must be utilized to a greater extent in the maintenance of aircraft, to the detriment of crew training time. Conflict between the decision areas is most evident in matters involving flight crew scheduling and flight crew morale.

In the long run, resolution of scheduling conflicts might be assisted by utilization of principles of economic analysis such as those advocated by Hitch and McKean in their book, *The Economics of Defense in the Nuclear Age*,⁴ provided appropriate criteria could be established. In the economic analysis, flight crew manhours are considered to be expended for increasing either factors of crew readiness or aircraft availability. The production possibility curve resulting from expenditure of a given amount of flight crew manhours assumes a familiar two-dimensional shape, shown in figure 7.

The optimal allocation of flight crew manhours to each of the two factors requires the use of indifference curves, which indicate constant levels of squadron readiness. Data to construct such curves were not available; however it is assumed that the curves will have a shape

⁴Charles J. Hitch and Roland N. McKean, *The Economics of Defense in the Nuclear Age* (Cambridge: Harvard University Press, 1961), pp. 110-112.

similar to that of figure 8.

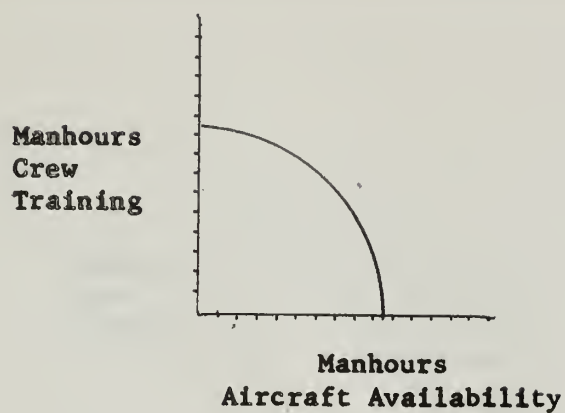


FIGURE 7

PRODUCTION POSSIBILITY CURVE

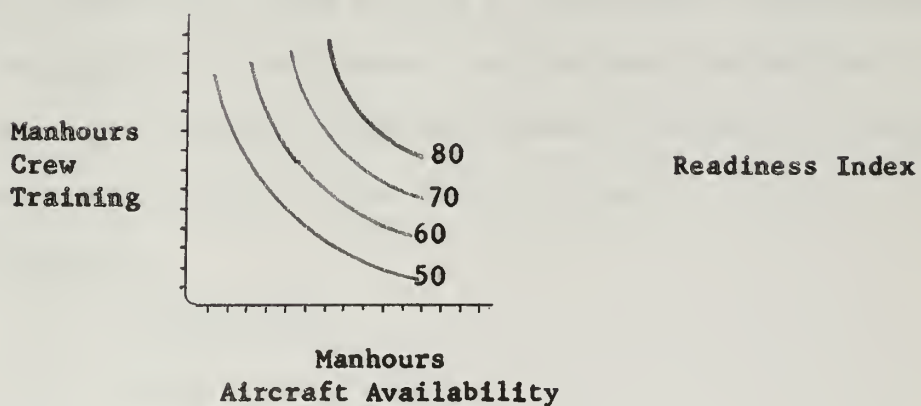


FIGURE 8

INDIFFERENCE CURVES

The combination of these oversimplified curves is shown in figure 9, and the point of tangency of the production possibility curve with

the highest valued indifference curve indicates the optimal mix of flight crew training and aircraft availability involvement by the flight crews.

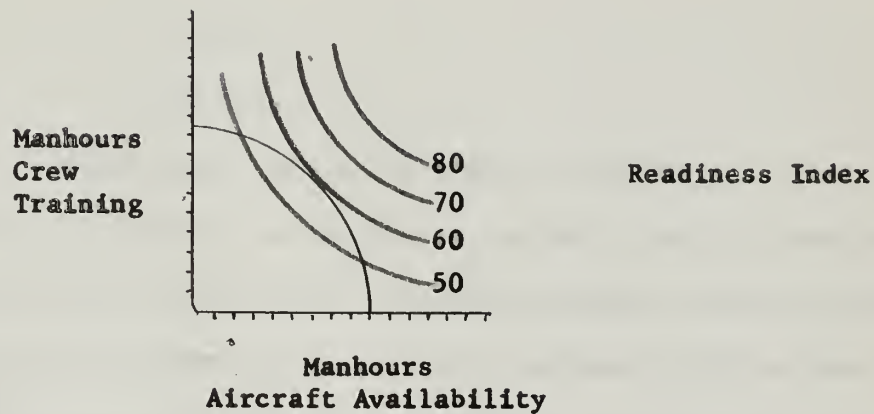


FIGURE 9

COMBINED PRODUCTION POSSIBILITY AND INDIFFERENCE CURVES

In the short run analysis, the problem cannot be presented in a simple two-dimensional figure because of the imposed suboptimization and the multiplicity of constraints, both external and internal, imposed on the day-to-day functions affecting factors of flight crew training and aircraft availability. These factors include, but are not limited to, the following:

1. Operating funds
2. Aircraft availability
3. Facilities availability
 - a. Schools
 - b. Targets
 - c. Maintenance
 - d. Operational trainers

4. Personnel availability

a. Medical

b. Administrative

1) Leave

2) Liberty

3) Military

5. Requirements imposed by higher authority

Unexpected changes or variations in any one or more of the above factors can, at any time, require scheduling changes to make the most effective use of the flight crew personnel manhours within either department. Intradepartmental channels exist which can resolve these scheduling problems to the satisfaction of the individual department. However, resolution of the individual department's problem by schedule adjustments, without interdepartment coordination, generates scheduling problems within the other department.

Within the framework of the present organization, conflict is reduced to a workable degree by an inordinate expenditure of time spent in coordination of the utilization of the same personnel to perform the separate functions of the Operations and Maintenance Departments.

The impact of this conflict in scheduling and the necessity to utilize the same personnel to perform separate departmental functions is reflected in the attitude of flight crew personnel. A survey of patrol squadrons conducted at the U. S. Naval Postgraduate School, by a Naval Warfare Seminar Project Panel in 1964, indicated that 17.9% of enlisted personnel presently serving as flight crewmen do not desire to

serve in this capacity.⁵ Various reasons were given for not desiring to fly, but the most frequent was the long hours necessitated by the requirement to both fly as a flight crewman and also to perform maintenance on the aircraft.

An additional organizational problem affecting flight crew attitude or morale is evident when the functional chain of command of the flight crew personnel is examined. A synthesis of that chain of command is shown in figure 10. A cursory examination of this figure reveals the multiplicity of supervisory personnel to whom the flight crewman is responsible in the performance of his duties.

Flight crew personnel are responsible to the Leading Chief Petty Officer through Section Leaders for the performance of military duties such as watch standing, drills and formations.

Flight crew personnel are responsible to the Maintenance Officer through their respective Divisions for the proper performance of work within their rates.

Flight crew personnel are responsible to the Operations Officer through the flight crew Flight and Ground Training Officer for the performance of training associated with crew readiness.

Flight crew personnel are responsible to the Patrol Plane Commander for performance of duties associated with the conduct of all operational or training flights. This includes pre-flight briefing, aircraft loading, pre-flight inspection of the aircraft, flight operations and post-flight briefing.

⁵LCDR R. A. Koch et al, "The Effect of Personnel Factors on VP/VS Antisubmarine Warfare Readiness," (paper read at the Naval Warfare Seminar, U. S. Naval Postgraduate School, Monterey, Calif., July 1964).

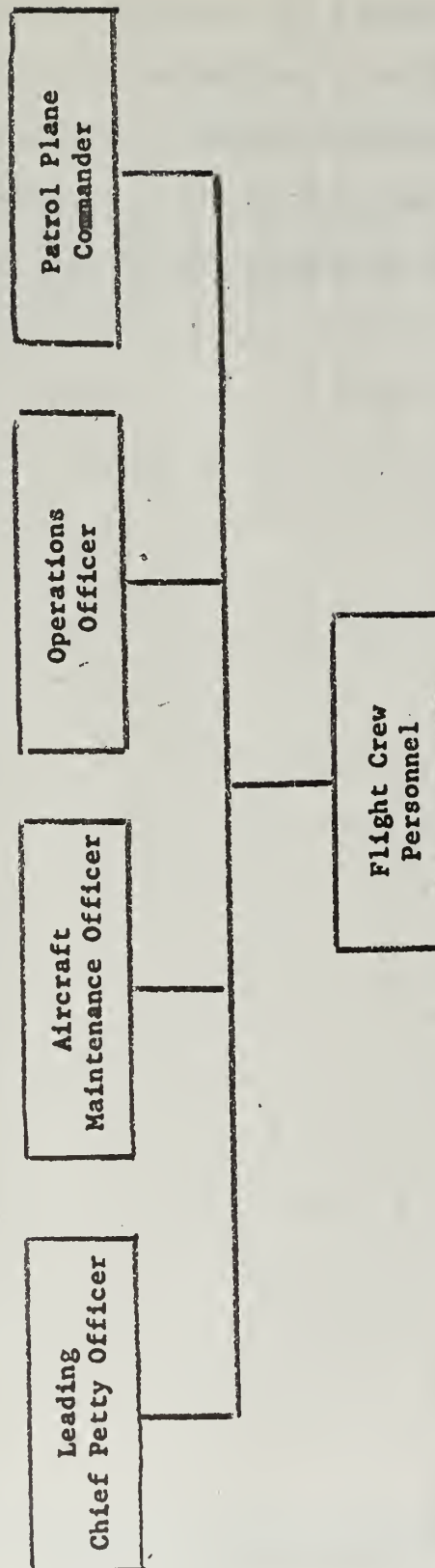


FIGURE 10
FUNCTIONAL CHAIN OF COMMAND
FOR
FLIGHT CREW PERSONNEL

The above clearly indicates the disregard for one of the basic fundamental principles of organization, unity of command. As stated in the book Naval Leadership, "Results from violation of this principle are obvious: a subordinate may find it necessary to violate orders from both superiors in order to take action; or, as an alternative, he may do nothing at all."⁶

⁶Malcolm E. Wolfe et al, Naval Leadership (Annapolis, United States Naval Institute, 1959), p. 230.

CHAPTER V

POSSIBLE SOLUTION

Solution of the problems discussed within the decision areas involves measures to obviate utilization of the same personnel to fulfill separate functions of separate departments in the optimization of the Readiness Index.

The most obvious organizational change which would accomplish this seems to be the separation of the personnel required to accomplish both flight crew and aircraft maintenance functions. This separation could be accomplished by the formation of a Flight Crew Division within the Operations Department as shown in figure 11.

The Flight Crew Officer under the Operations Officer would be responsible for all aspects of flight crew readiness. This minor change does not require any major revisions of current responsibilities for flight crew readiness in that the Operations Officer is presently responsible for these functions.¹ Personnel required to fulfill the functions would be assigned directly to the Flight Crew Division and be responsible to the Flight Crew Division Officer for overall performance and to the Patrol Plane Commander for airborne performance. Flight crew personnel should not be required to perform routine military watchstanding duties scheduled by the Leading Chief Petty Officer, but should be required to stand only ready, alert, standby and other duties

¹NWIP 41-1, ASW Patrol Aircraft (U), Department of the Navy, Office of the Chief of Naval Operations, 20 June 1961, p. 2-5.

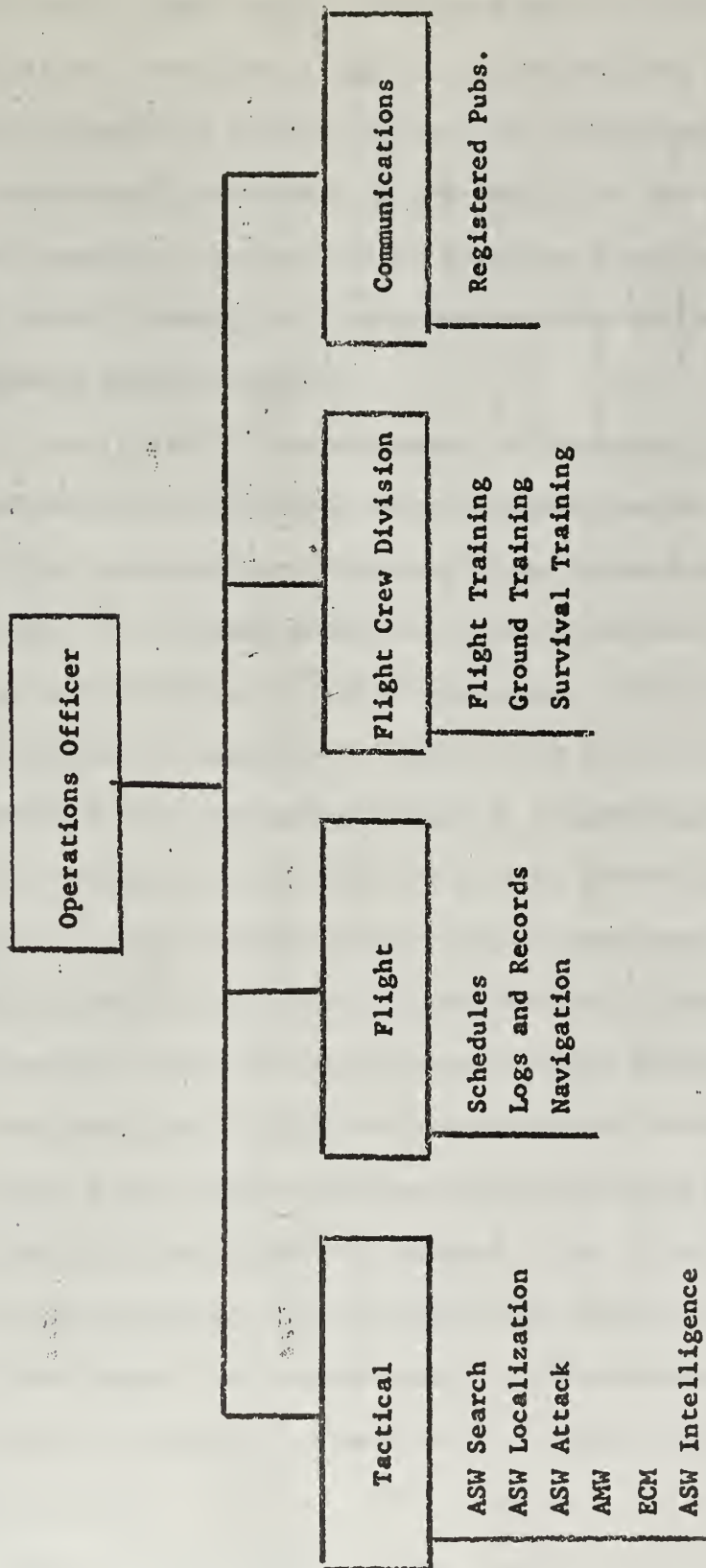


FIGURE 11

PROPOSED OPERATIONS DEPARTMENT ORGANIZATION

which provide flight crew training and directly involve operational readiness or operational flights. Any expenditure of flight crew man-hours in pursuit of goals other than the development of a cohesive, well coordinated operational flight team is to the detriment of operational readiness. The scheduling of flight crews in performance of ready, alert, standby, and other duties would be the function of the Flight Crew Division Officer.

The net result of the assignment of responsibilities, functions, and personnel in this manner would eliminate two of the four seniors in the flight crew members' functional chain of command shown in chapter IV, figure 10. Further reduction is not plausible in view of the nature of the activities of the flight crews. When flying, "the Patrol Plane Commander, regardless of rank, is an officer assigned and so designated by his Commanding Officer as possessing full responsibility for the successful completion of a mission and the safety of aircraft and crew."² When not involved in flight operations, however, greater efficiency can be achieved by centralization of control of the flight crew functions under the Flight Crew Division Officer.

The above centralization of authority and responsibility for the functions of the flight crews also serves to bring about conformity with the principle of unity of command. The flight crew personnel would now be responsible to only the Operations Officer when not actually flying. This allows the maximum amount of departmental flexibility in the utilization of flight crew manhours for flight crew training and

²NWIP 41-1, op. cit., p. 4-3.

development of the maximum possible crew readiness.

Recognizing the fact that most flight crew member functions do not require extensive maintenance capabilities, the present assignment of maintenance rates to flight crews appears to be an extravagant waste of maintenance trained personnel.

As shown by the typical flight crew listed in chapter III, the functions of the enlisted flight crew, with the exception of the plane captain, are primarily equipment operation for search, detection, classification, localization and attack. Present weapon system reliability and sophistication does not require and, in many cases, defies inflight repair due to the extensive test equipment required to perform repairs. It would appear that extensive and expensive training, especially in the electronics field, of personnel prior to assignment to flight crew status is unnecessary, and uneconomic. The establishment of a flight crew rate with limited training as weapons systems operators seems more appropriate to fulfill the flight crew functions. This rate should include the requirements that all personnel be volunteers and physically qualified for duty involving flying as flight crew members.

The flight crew rating need not be established as a career rating. Indeed, the interests of the Navy and the personnel involved seem to be served best by limiting the duration in this capacity. Personnel could be recruited directly as flight crew candidates, trained in a minimum amount of time, and distributed to the Fleet squadrons for maximum realization of flight crew potential. Issuance of permanent orders to duty involving flying similar to those of Naval Aviators and Naval Aviation Observers should be considered for flight crew personnel while attached

to a squadron.

Service as flight crew members could be limited to personnel in their first tour of sea duty, except in special cases, such as flight test and instructor crews. All career-motivated flight crew personnel would be ordered to training schools ashore following completion of the first sea duty tour for training and conversion to maintenance ratings. Especially well-qualified personnel completing the training could be returned to fulfill special case requirements mentioned above. Career patterns after completion of maintenance training would be normal for the ratings selected. These personnel would be utilized in performance of maintenance functions only.

There are several advantages of the above system. Highly motivated, volunteer personnel would be utilized as flight crew members. Expenditure of funds for maintenance training would be reduced. Costs of the hazardous duty pay program would be reduced by the elimination of paper work. Operator efficiency would be increased as a result of the functional approach to the flight crew candidate training program.

Separation of the functions of flight crew and maintenance personnel is recognized as evidenced by the separate categories set forth in the personnel planning factors.³ However, application of manning level constraints must recognize adequately the interaction which exists between flight crew and maintenance functions. Instead of applying to the squadron personnel as a whole, the manning level constraint should be applied to the functional areas separately to provide for optimum

³OPNAV Instruction 05311.3C. Personnel Planning Factors for Aviation Activities (U), 1965.

utilization of personnel and primary mission equipment.

Separation of flight crew and maintenance personnel functions would require that manning level constraints be applied in three separate areas: aircraft allocation/availability, flight crew allocation, and maintenance personnel allocation. The identical manning level figure or constraint need not be utilized for both flight crew and maintenance personnel although this situation is the most desirable and efficient. The manning level constraint for each area would be determined by the availability of personnel for assignment in the flight crew rate and maintenance rates. Both of the constraints, however, must be considered in establishing a constraint within the aircraft allocation/availability area.

Three possible situations could exist within a squadron under the proposed application of manning level constraints: constraints applied to flight crew personnel only, with 100% manning of maintenance rates, constraints applied to maintenance personnel only, with 100% manning of flight crew rate, and constraints applied to both maintenance and flight crew personnel.

In the first case, where constraints are applied to flight crew personnel only, the imposed reduction in flight crew personnel must be accompanied by a proportionate reduction in aircraft allocated or assigned to the squadron. Although maintenance personnel will be available to maintain a full allowance of aircraft, flight crews will not be available to man a full allowance of aircraft.

The second case above, where constraints are applied to maintenance personnel only, the imposed reduction of maintenance personnel must be

accompanied by a reduction of aircraft utilization proportionate to the manning level constraint. Flight crews will be available for all aircraft but maintenance personnel will not be able to maintain the aircraft at the previously assigned utilization level.

The third situation, where constraints are applied to both flight crew personnel and maintenance personnel, requires a proportionate reduction in the number of aircraft assigned, and a reduction of required utilization if necessary. This last situation provides the most desirable situation for efficient personnel utilization when forced to operate under manning level constraints.

Application of the manning level constraints in these separate areas accomplishes two separate purposes. First, any trend toward a large imbalance between flight crew and maintenance personnel, as in situations one and two above, although beyond squadron control, would alert higher authority of the necessity to initiate corrective action by changes in recruiting and selection criteria to achieve a more effective personnel balance. Second, and most important, this application requires a reduction in aircraft assigned and/or aircraft utilization when personnel are reduced. This allows the squadron to obtain normal effective manhour utilization of the personnel available and at the same time recognizes the actual reduction in total squadron capability.

Recommendations to resolve the organizationally induced conflict associated with the allocation and utilization of flight crew personnel, briefly, include the following:

1) Establishment of a Flight Crew Division within the Operations Department.

2) Establishment of a flight crew rating.

3) Appropriate application of manning level constraints and factors.

Adoption of these recommendations could result in improved operational readiness with minimal organizational changes and possible enhanced personnel utilization.

CHAPTER VI

IMPLICATIONS

The recommendations set forth in the previous chapter were formulated to reduce organizationally induced conflict within individual squadrons. This conflict could, no doubt, be reduced by other methods; however, the solution presented allows, to a greater degree than presently allowed, the required suboptimization of department heads within individual squadrons. Suboptimization in itself is not bad, in fact "suboptimizations are both necessary and inevitable and provide scope for productive quantitative analysis of important problems of choice."¹

The recommendations allow each department a more compact decision area of how to utilize its own manhours instead of the multiple decision area of how departments are to utilize available manhours jointly. This streamlining of the decision areas seems a necessity within operational units, for it allows more time for actual performance of the required functions and requires less expenditure of time in interdepartmental coordination.

The problem of personnel allocation would no longer be a problem within the squadron as maintenance and flight crew personnel would automatically be allocated by rate as well as functions. This problem of personnel allocation would not disappear, however; it would be elevated to a higher echelon and dealt with as a staff function in relation to all patrol squadrons.

¹Charles J. Hitch and Roland N. McKean, The Economics of Defense in the Nuclear Age (Cambridge: Harvard University Press, 1961), p. 129.

The functional application of the manning level constraint figure by higher authority will also allow preparation of selected squadrons for deployments. Squadrons could be readied for deployed duty in advance by adjusting the individual squadron's manning levels in maintenance and flight crew personnel. If necessary, this could be accomplished at the expense of squadrons not scheduled for deployment in the near future. In other words, manning level constraints could be varied between squadrons for the most effective use of the individual squadrons, as determined by higher authority.

Application of the manning level figure to the aircraft allocation/utilization will also reflect the true capability of a squadron. Under present conditions all squadrons are expected to maintain the standard allowance of aircraft and meet standard utilization requirements regardless of manning level. In most cases this is accomplished, but utilization, per se, does not indicate that optimum operational readiness was achieved and the accomplishment should not cloud the obvious fact that a squadron operating under manning level constraints does not have the capability of a fully manned unit. Application of the manning level figure in this area will immediately indicate, by aircraft allowance reduction, or reduced aircraft utilization requirement, the actual capacity of the squadron.

Planning and programing of ASW commitments by higher authority are based on the existing and expected future capabilities of operating units. Therefore, it is of the utmost importance that these authorities immediately realize any reduction of capability. Although the solution recommended by this paper is designed to help reduce organizational conflict within the individual squadron, it also generates information which could be useful to higher authority for planning and programing purposes.

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